7652.

SCM PIGMENTS
SCM CORPORATION

2426 MIDDLE ROAD, PLANT 2, P. O. BOX 160, ASHTABULA, OHIO 44004 (216) 997-5501

VIA FEDERAL EXPRESS

August 14, 1986

recd Aug 15, '86
EPA

Ms. Margaret McCue
Attention: Fields Brook Public Comment
U.S. Environmental Protection Agency
(5PA-14)
230 South Dearborn Street
Chicago, Illinois 60604

Re: Fields Brook Sediment Operable Unit
Feasibility Study

Dear Ms. McCue:

SCM Corporation hereby submits the attached comments on the Fields Brook Sediment Operable Unit Feasibility Study.

Very truly yours,

Douglas A. Towner

Frank Tyneski

Enclosure

COMMENTS OF SCM CORPORATION ON THE JULY 3, 1986 FEASIBILITY STUDY FOR THE FIELDS BROOK SEDIMENT OPERABLE UNIT

August 14, 1986

Of Counsel

Ronald R. Janke
Heidi Hughes
Jones, Day, Reavis & Pogue

PRELIMINARY STATEMENT

Basis for Commenting

SCM Corporation ("SCM") is filing these comments because it has been named by EPA as one of a group of 18 potentially responsible parties ("PRP") with respect to the Fields Brook Sediment Operable Unit Feasibility Study ("FS"). (Letter dated July 18, 1986 to SCM from Kerry Street, Hazardous Waste Enforcement Branch, EPA Region V.) However, SCM should have not been included on this list and should not be considered a PRP.

Inadequate Time for Public Comments

EPA has not given SCM an adequate time to analyze the FS and submit comments thereupon. SCM, through the Fields Brook Task Force, has requested a 60-day extension of the original August 15, 1986 comment deadline. However, only a ten-day extension was granted. On August 5 the Task Force renewed its extension for additional time.

The FS is simply too complex and difficult to understand to allow such a short time for comments. In this respect, it should be noted that it has taken EPA almost a year to prepare the FS, and the agency's own internal review of drafts of the FS consumed many months. In addition, the FS contains the exposure assessment which was not published as part of the March 28, 1985 Remedial Investigation Report ("RI"). Accordingly, SCM comments herein are of necessity

incomplete and not as detailed as they would have been if an adequate comment period had been allowed.

PEG's Comments

SCM incorporates by reference the comments being submitted on the FS on behalf of the Fields Brook Task Force, of which SCM is a member, to the extent that such comments are not inconsistent with the comments expressed herein. Because of the inadequate comment period, SCM has been unable to review in final form PEG's comments and therefore P&G's comments do not necessarily state SCM's position.

I. EPA Is Acting Unreasonably and Contrary to the National Contingency Plan in Evaluating and Selecting Remedial Alternatives for Fields Brook Sediments.

A. EPA Should Not Make a Remedial Decision Regarding the Fields Brook Sediments Because EPA Has Not Identified the Sources of Sediment Contamination.

At some point between the preparation of the RI and the FS, EPA decided to divide its Fields Brook site response actions into three "operable units":

(1) Fields Brook Sediments

(2) Ashtabula River Sediments and

(3) Source Identification and Groundwater Investigation.

The FS addresses only the Fields Brook Sediments Operable Unit. EPA has not proceeded with work on the other two operable units.

Because EPA has not performed the source identification and groundwater operable unit, it does not know whether Fields Brook sediments, if removed will become recontaminated. The RI states that the "specific sources of contaminants detected in sediments of the Fields Brook watershed have not been identified" and that "it is unknown if these sources are historic or ongoing in nature." RI at 5-16. The FS does not identify these sources, rather it "assumes that other RI/FS will be undertaken to identify these sources and determine the appropriate source remedial actions." FS at 1-27. Although the FS correctly notes that industrial wastewater discharges into Fields Brook have improved in quality and that any leachate reaching the Brook is likely to move slowly, the fact remains that EPA has not identified the sources of sediment contamination. For example, EPA proposes to excavate a Reach 9, an unnamed tributary downstream of Columbus Avenue, but, to SCM's knowledge, no source of apparent contamination has been identified by EPA in this tributary. Thus, particularly with respect to Reach 9, there is no basis to speculate as to this Reach that whatever the source of contamination, it will not recontaminate the sediments.

EPA cannot reasonably determine that Fields Brook sediment should be removed in a certain way and treated and disposed of in a certain way -- as it has done in the FS -- without knowing whether additional action is needed to prevent recontamination and whether such action can be undertaken

consistent with the NCP. The NCP requires determination that an operable unit is cost-effective and is consistent with achieving a permanent remedy. 40 CFR § 300.68(c)(3). EPA has not and cannot at this point makes these determinations as to a Fields Brook sediment removal without having identified the sources of contamination.

If source controls are needed to prevent recontamination such controls must be instituted before sediment removal occurs; otherwise, sediment removal would not be cost-effective. The cost of any such source controls should be considered as part of the cost-effectiveness of any remedial action at the Fields Brook site. Furthermore, if the source itself cannot be effectively and reasonably controlled because of cost-effectiveness, fund-balancing or other reasons, the costs of sediment removal and planning sediment removal are not consistent with a permanent remedy nor are they cost-effective. Therefore, EPA should not proceed to select a remedial alternative for Fields Brook sediments until it has identified the sources of contamination, determined whether recontamination requiring response action will occur, and evaluated measures, if any, needed to prevent recontamination.

B. EPA Should Not Make a Remedial Decision Regarding Fields Brook Sediments Because EPA Is Considering Whether Remedial Action Is Needed for Ashtabula River Sediments.

The March 28, 1985 RI included an analysis of the Ashtabula River water, sediment and aquatic life. However, in

the FS, EPA proceeded to consider only Fields Brook. EPA has stated that at a future date it intends to prepare a separate (and somewhat repetitive) RI/FS for the Ashtabula River sediments outside of the Corps of Engineers navigational zone which will be dredged in 1988. If EPA believes that sediment removal from the Ashtabula River may be necessary, it should not prepare to select and design remedial activities and facilities for handling just Fields Brook sediments, because those activities and facilities may not be cost-effective and consistent with a permanent remedy. EPA has not determined that its Fields Brook recommendations are cost-effective and consistent with a permanent remedy in light of its decision to do an Ashtabula River RI/FS.

II. EPA'S Exposure Assessment Is Unreasonable

A. EPA Has Not Supported Its Estimates of Ingestion of Sediments from Fields Brook

The FS contains no analysis of the actual extent and duration of any human exposure to Fields Brook sediments. The exposure assessment contains theoretical calculations of the increased risk of cancer due to lifetime ingestion of Fields Brook sediments by area residents and workers. EPA's assumptions and calculations are unreasonable and are not supportable.

As an estimate of the ingestion of Fields Brook sediments by area residents, EPA uses an estimate of soil ingestion contained in a paper by Kimbrough et al. The

Kimbrough estimate is not valid for Fields Brook sediments because it is based on soil, not sediment. Estimates of ingestion of soil in residential areas are not applicable to ingestion of sediments which are under water. By any measure, sediment ingestion is truly de minimis. It is simply unreasonable to assume that a Fields Brook area resident ingests sediment 219 days per year for a seventy-year period.

B. EPA's Risk Assessment Based On The Ingestion Of Arsenic Is Unreasonable; Arsenic Levels In Fields Brook Sediments Do Not Require Remedial Action.

I. Summary of Dr. Hartung's Preliminary Evaluation.

Attached hereto and submitted as part of SCM comments is a preliminary evaluation of the arsenic exposure and risk assessment portion of the Feasibility Study which has been prepared by Dr. Ralf Hartung. Because of time limitations, Dr. Hartung's review was limited to arsenic but his criticism of the FS have obvious application to other parameters as well.

Included in his evaluation, Dr. Hartung notes the following:

1. The statistical derivation of the background concentrations for arsenic is wrong.

2. Arsenic concentrations in Fields Book sediments are well within the specrum of arsenic concentrations found in naturally occuring soils and agricultural soils.

3. The Kimbrough soil ingestion estimates are unverified and not applicable to sediment ingestion.

4. The average daily intake of arsenic from sediments, as calculated by the FS, is trivial compared to the intake of arsenic from food or from water which meets EPA's drinking water standard for arsenic.1/

5. The FS fails to demonstrate that the arsenic content in the sediment of Fields Brook or its tributaries present an undue risk.

2. The Recommendation To Excavate Fields Brook Sediments in Reaches 8 and 13 Because of Arsenic Is Unreasonable.

The FS recommends excavation of the approximately 1000 linear feet of sediments in the further downstream portion of Reach 8. This area of proposed excavation runs approximately from the railroad track crossing on Fields Brook upstream to the mouth of an unnumbered tributary. FS at Figure 5-1. The apparent basis for this recommendation is EPA's excess lifetime cancer risk calculations for exposure to arsenic. FS at Figure 2-1. The recommendation to excavate this portion of Reach 8 because of an excess lifetime cancer risk calculation for arsenic is unreasaonable for several reasons.

First, according to EPA's two sediment sampling data for this portion of Reach 8 (SD019 and SD020), arsenic

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1. This raises questions both as to the reasonableness of cancer risk calculations and the use of those calculations instead at the drinking water standard in assessing risk based on arsenic ingestion. In this case, the drinking water standard would seem to be the more appropriate health based guidelines.

concentrations in the sediment do not exceed typical concentration ranges for soil. FS at Figure 1-11. EPA's sediment sampling for the upstream portion of Reach 8 (SD023 and SD025), which EPA does not propose to excavate, also shows that arsenic concentrations do not exceed typical concentration ranges for soil. FS at Figure 1-11.

Second, the portion of Reach 8 which EPA does propose to excavate includes a stream segment approximately 400 feet in length which was excavated in 1982 by Olin Corporation. Therefore, it is unreasonable for EPA to conclude that an area excavated in 1982, in which it has taken no sediment samples, requires excavation based on sampling data taken outside the area in 1983 and 1984.

EPA cannot justify a recommendation to excavate Reach 8 based upon the arsenic concentration found in sample SD022 in Reach 13. First, for reasons pointed out elsewhere in these comments, the SD022 sampling point arsenic value (102 mg/kg) does not justify an excavation of Reach 13. Second, it cannot be inferred that the downstream portions of Reach 8 have arsenic levels as high as at SD022 in Reach 13 because the arsenic sediment sampling in that portion (SD019 and SD020) shows concentrations which do not exceed typical concentration ranges for soil.

Lastly, it must be emphasized that EPA's exposure assessment for arsenic based on sediment ingestion simply do not make sense for Reaches like 8 and 13. These Reaches lie

within industrial areas. In these Reaches there is no ingestion of sediment by residents because there are no residents. Young children, who ingest soil at the highest rate according to EPA's calculations, are not brought to the industrial areas of Fields Brook. Access and therefore exposure to Fields Brook sediments in the industrial areas of Fields Brook simply do not exist for residents.

As for occupational exposure, SCM has no employee who are exposed to Fields Brook sediments for 243.25 days per year for 40 years. Except for one or two persons who take water samples, no SCM employee is ever near the bank of Fields Brook other than on a very rare occasion. No employee ever enters Fields Brook or has direct contact with the sediments therein. Thus, the occupational exposure assessments are simply not credible.

III. EPA's Sampling Data is insufficient to Characterize the Fields Brook Sediments For the Purpose of Selection A Remedy

The RI/FS does not provide sufficient, accurate data upon which to select or implement any remedial alternative for the Fields Book site. The feasibility study and the EPA contractor stress that additional sampling is needed to define the extent of sediment contamination. The selection of a remedy by EPA prior to a thorough and accurate sampling program would be premature and inconsistent with the NCP.

A. Insufficient Sampling Data

The initial sampling data which was gathered during the remedial investigation is insufficient to establish the depth and volume of contaminated sediments at the Fields Brook site. The data sampling size is simply insufficient to detect any areas which might contain relatively uncontaminated sediments and which do not require excavation. An additional sampling program such as that required by the EPA Remedial Investigation Guidance (3.2.6) should be conducted to establish an accurate characterization of the extent of contamination at the Fields Brook site.

The feasibility study assumes a consistent depth of contamination for all sediments at the Field Brook Site. Obviously, this assumption is not supported by the sampling data which has been done. Using this estimate for comparing total excavation alternatives is inconsistent with the NCP because the data would not support the selection of cost effective remedy.

IV. The Feasibility Fails To Consider The Full Range of Remedial Alternatives

The Fields Brook feasibility study fails to evaluate and consider a full range of practicable remedial alternatives as required by the NCP. The feasibility study fails to evaluate partial removal alternatives, alternative thresholds for determining the extent of sediment removal, in-situ treatment and capping alternatives, and modified removal and dewatering alternatives.

A. Partial Removal Alterntives

Based on the valid sampling data and the revised risk assessment evaluations, the only remedial action which may be necessary at the Fields Brook site may be the partial removal of sediments which are largely at or near the surface of the site. This approach, sometimes referred to as "hot spot" excavation, has been widely used by EPA (see Outboard Marine Corp., Il, Superfund Record of Decision 5/15/84 - fund balancing used to justify removal of hot spots from contaminated river sediment; Resolve, MA, Superfund, REcord of Decision, 7/1/83 - remedy included only removal of hot spots containing high concentrations of contaminants). The excavation of hot spots at the Fields Brook site is an appropriate alternative to consider because the site is not uniformly contaminated with high levels of hazardous substances.

B. Alternative Thresholds

In the evaluation of remedial alternatives EPA also fails to consider a full range of threshold limits for determining the extent of sediment removal. EPA has adopted criteria and action levels for other EPA approved remedies at similar Superfund sites which do not require excavation to background levels.

For example, the selected remedy for another Region V Superfund site includes excavation and off-site disposal of highly contaminated soils which exhibit the EP toxicity

characteristics. (Byron Johnson Salvage Yard, Il. Superfund Record of Decision 3/11/85). In the Byron/Johnson Record of Decision, Region V specifically rejected a remedial alternative that called for excavation of contaminated soil to background levels because implementation of this alternative was considered "impractical." (ROD, page 9). In adopting the threshold levels using the EP toxicity characteristic as an indicator, Region V stated that this alternative: (1) was less costly than excavation to background level; (2) provided for cleanup of highly contaminated surface soils; (3) offered the advantage of minimal operation and maintenance requirements; and (4) required a relatively short time to implement. (The Agency will evaluate the effectiveness of the removal action in an off-site RI/FS scheduled to run concurrent with the remedial implementation.)

The threshold level for determining the removal of arsenic from contaminated soils has also been addressed by EPA at a number of Superfund sites. For example, at the Celtor Chemical site EPA set specific soil and sediment removal action levels for arsenic at 100 mg/kg as derived from the EPA National Ambient Water Quality Criteria. (Celtor Chemical CA. Superfund Record of decision 9/30/85). The Celtor Record of Decision cites an advisory from CDC prepared for another Superfund site as support for the 100 mg/kg action level for arsenic (ROD, page 12). This level was also reportedly used at the Crystal Chemical site. At 50 Federal Reigster 47923 (Nov. 20, 1985), EPA states:

> At the Crystal Chemical Company site in Texas, EPA has tentatively determined that off-site soil contaminated with arsenic may be cleaned up to a 100 parts per million level, pending verification monitoring. The 100 ppm level has been determined by the Agency for Toxic Substances and Disease Registry (ATSDR) of the Center for Disease Control, Department of Health and Human Services; to be a safe level based on direct ingestion of the contaminated soil by a child.

EPA should have included a full evaluation of a vicinity of threshold levels for sediment excavation in the development of remedial alternatives for the Fields Brook feasibility study.

C. Other Alternatives

EPA also failed to consider other practicable remediation techniques such as in situ treatment and capping, and alternative on-site dewatering and separation methods. These proven techniques may present viable, cost effective alternatives to the EPA recommended remedial alternative for the Fields Brook site. At a minimum, the NCP requires that these types of practicable alternatives be considered by EPA during the initial screening of alternatives.

V. EPA's Recommended Remedial Alternative is Not Cost-Effective

The recommended remedial alternative set forth in the Fields Brook feasibility study is not the cost-effective remedy and is not supported by the feasibility study or the existing administrative record.

A. Cost Screening

The NCP requires EPA to conduct a cost screening analysis of all available remedial alternatives. EPA failed to consider the cost for each alternative during the initial screening of alternatives in Chapter 4 of the Fields Brook feasibility study. This is a direct breach of the Agency's duty under NCP §300.68(g)(1) which requires the consideration of the cost of implementing each initial alternative.

Further, EPA did not conduct sufficient cost screening of the four remedial alternatives analyzed in Chapter 4. For example, EPA failed to consider operation and maintenance costs, costs of land acquisition or obtaining permanent easements, or the costs of dismantling any incinerator which may be constructed at the site. The NCP §300.68(h)(2)(ii), and the EPA Feasibility Study Guidance (2.5.2.1.) require EPA to consider all of these specific costs components during the cost screening process used to evaluate competing alternatives.

B. Cost Effectiveness

The EPA's recommended remedial alternative is not a cost effective remedial action for the Field Brook site because of the major flaws in the feasibility study which have been set forth in these comments, (i.e., problems with the scope of the operable unit, sampling errors, exposure and ingestion miscalculations, and improper evaluation of alternatives). Until these flaws are cured, EPA cannot make the cost

effectiveness determination required to support the selection of a remedy for the Fields Brook site.

In addition, based on EPA's own analysis of the alternatives, Alternative 4 is not cost effective compared to Alternative 2. With respect to both alternatives, the FS states that there are "no adverse effects anticipated." Thus, both alternatives satisfy the environmental criteria. EPA's preference for Alternative 4 stems from the belief that it has "greater long-term environmental benefits" because certain organic chemicals in about 40 percent of the sediments will be destroyed through thermal treatment. What these "benefits" are, how they are valued or why it is cost-effective to attain them are not stated. If no adverse effects are anticipated from Alternative 2, it is unreasonble and not cost-effective to go further and employ thermal treatment as proposed by Alternative 4.

PRELIMINARY EVALUATION

OF THE EXPOSURE AND RISK ASSESSMENT SECTIONS

FOR ARSENIC

OF THE FIELDS BROOK FEASIBILITY STUDY

FOR SEDIMENT REMOVAL.

Prepared by Rolf Hartung, Ph.D., D.A.B.T.
Consultant in Environmental Toxicology
3125 Fernwood Ave.
Ann Arbor, Michigan 48104-7155

August 8, 1986

Assessment of Background Arsenic Concentrations

Statistical Considerations:

The organization of the CH_2M-Hill report does not facilitate an assessment of the distribution of single pollutants, such as arsenic. Consequently the arsenic data were retabulated in Table 1.

The authors of the feasibility study estimated a local background concentration for arsenic by determining the mean and standard deviation from 9 samples from 5 selected sites, and attempted to develop an upper 99.9 % confidence limit. If one assumes the samples which were below the operational detection limit to contain arsenic at that limit, then the average of those 9 samples is 5.9 mg/kg with a standard deviation of 4.5 mg/kg, as reported in Table 4-2 of the Final Remediation Investigation Report. However, the derivation of the 99.9 % confidence limit is erroneous, if it is to be used as a benchmark for the comparison of individual values rather than sample means. The calculated confidence limit, using the standard error of the mean is appropriate for the comparison of sample means at the 99.9 % confidence level, assuming normal distributions. To compare a single value to the sample mean for background values, requires the use of the sample standard deviation, rather than the standard error. The arsenic concentration which would delimit 99.9 % of the individual values, assuming a normal distribution, is approximated by:

$$5.9 + (5.041 \times 4.5) = 28.6 \text{ mg/kg.}$$

Table 1

AVAILABLE DATA ON THE DISTRIBUTION OF ARSENIC IN THE FIELDS BROOK WATERSHED.

Station	Description	Concentration (mg/kg) at Depth 0-6"	6-12"	12-18"
1	Mouth of Ashtabula River	4.3		
2	Ashtabula River; going upstream	7.6	8.7	7.5
3	Ashtabula River; further upstream	8.4	7.0	4.2
4	Ashtabula R.; below Fields Brook	<1.9	4.9	7.5
5	Ashtabula R.; above Fields Brook	5.0	5.8	10.7
6	Ashtabula R.; further above Fields	B.10.5	6.6	
7	Mouth of Fields Brook	<0.7		
9	In 1st Tributary of Fields Brook	<0.6		
10	Fields Brook, W. of S.R. 11	3.9	3.5	12.6
11	In Mouth of S.R. 11 Tributary	8.8		
12	Upstream in S.R. 11 Tributary	6.4	<0.5	
13	Fields Brook, upstream of S.R. 11 Tr.	<1	12.6	7.9
		10.3		
14	In Mouth of D.S. Tributary	20.2	17.9	5.7
24	D.S. Tributary, upstream	9.0		
		8.8		
		<0.7		
15	Fields Brook, upstream of D.S. Trib.	3.9	4.9	12.5
		9.2		
16	Fields Brook, west of State Rd.	4.2	4.0	3.6
		7.2	1.2	2.6
17	Fields Brook, east of State Rd.	7.2	4.2	
		10.5		
21	Fields B., downstream of Detrex Tr.	55.6		
		37		
		49.6		
18	In Mouth of Detrex Tributary	103.4	70.4	32.6
		111	91.4	
19	Fields Brook, upstream of Detrex Tr.	18.1		
20	Fields Br., downstream of Unnamed Tr.	3.8	<1	
22	In Unnamed Tributary	102		
23	Fields B., upstream of Unnamed Tr.	5.5	14.8	
25	Fields Brook, far upstream	5.8	4.6	

Summarized from Tables E-9 to E-14 of the Final Remedial Investigation Report, Fields Brook Site, Ashtabula, Ohio. Contract 68-01-6692, CH_2M-Hill. March 28, 1985.

In the case of the Unnamed Tributary, many far-reaching conclusions are made on the basis of a single analytical value.

In addition, these statistical and computational considerations relating to the background concentration for arsenic based on local differences in arsenic levels can readily obscure more significant issues relating to the interpretation of arsenic concentrations in soils or sediments.

Background Concentrations of Arsenic:

The CH_2M-Hill report relies heavily on a review by Lindsay (1979) to establish "typical" ranges (actually termed "common" ranges by Lindsay) for the various inorganic constituents in soils. Neither the terms "common" or "typical" are rigorously defined, and these descriptors are clearly not synonymous.

The cursory treatment of background arsenic concentrations provided in the CH_2M-Hill report is clearly misleading to those readers who are not familiar with the scientific literature on arsenic. In the case of arsenic, a much more thorough treatment of its occurrence, transport, fate and effects associated with specific exposures is found in: National Research Council, Committee on Medical and Biologic Effects of Environmental Pollutants (1977). Arsenic. National Academy Press. Washington. The NRC report (page 18) indicates that the natural arsenic content in virgin soils varies from 0.1 to 40 ppm, with an average of 5-6 ppm, which varies considerably among geographic regions. Soils overlying sulfide ore deposits commonly contain

arsenic at several hundred ppm, with a reported maximum of 8,000 ppm. Pertinent tables from the NRC Report on arsenic in sedimentary rocks and in sediments are reproduced on the following page.

Agricultural uses accounted for 81 % of the total consumption of arsenic in 1973. The repeated use of arsenic compounds as pesticides has produced large residues in some soils, especially if they contain iron hydroxides or aluminum containing clays. Arsenic concentrations in orchard soils of 194 to 389 ppm have been estimated, and a concentration of 2,500 ppm has been measured, presumably under different circumstances. At high concentrations of freely available arsenic, phytotoxicity has been observed. However, the uptake of arsenic by plants is not proportional to the concentration in soils, and the NRC report makes the generalization that there is no correlation between the arsenic concentration in plants and that in the soils which they grow in.

In this perspective the arsenic concentrations found in the sediments of Fields Brook and some of its tributaries, although elevated above the local background, are well within the spectrum of arsenic concentrations found in naturally occurring soils and agricultural soils.

Exposure Assessment:

The exposure assessment for arsenic in sediments uses an unverified construct which was developed by Dr. Kimbrough and her associates to allow an exposure assessment for 2,3,7,8-tetrachlorodibenzo-p-dioxin in surface soils. Even in that particular

TABLE 3-2 Arsenic in Sedimentary Rocks[a]

Rocks	No. Analyses	Arsenic Concentration, ppm: Range Usually Reported	Arsenic Concentration, ppm: Average
Limestones	37	0.1–20	1.7
Sandstones	11	0.6–120	2.0
Shales and clays	324	0.3–490	14.5[b]
Phosphorites	282	0.4–188	22.6
Sedimentary iron ores	110	1–2,900	400?
Sedimentary manganese ores	—	(up to 1.5%)	—
Coal	1,150	0–2,000	13[c]

[a] Estimated on the basis of data of Onishi[695] and Boyle and Jonasson [7]

[b] Excluding one sample with arsenic at 490 ppm

[c] Boyle and Jonasson[7] gave 4 ppm.

TABLE 3-5 Arsenic in Sediments

Locality	Arsenic Concentration, ppm	Reference
United States:		
New York, Chautauqua	0.5–306.0	694
Texas	3.6	3
	0.8–8.0	654
Winyah Bay	8.0–12.0	394
Lake Michigan	5.0–30.0	689
	7.2–28.8	720
Lake Superior	2.8–5.4	720
Lakes, Wisconsin	0.1–45.0	727
Sugar Creek (contaminated)	4,470–66,700	859
Puget Sound	2.9–10,000	186
Washington, rivers		
Skagit	15–34	186,187
Stillaguamish	17–48	186,187
Snohomish	22–74	186,187
Duwamish	15–40	186,187
Puyallup	2.6–7.5	186,187
Nisqually	4.5–12	186,187
Dosewallips	7.4	186,187
Duckabush	6.8	186,187
Japan	0.0–93.4	405
Minamata area	4.7–60	319
Netherlands, Rhine Delta	ND–310	197
New Zealand:		
Waiotapu Valley muds	51–14,250	312
Marine	6.6	652
Pelagic	40	819
England	<2–5,000	38,456,789

ND = Not detected.

application, the model incorporates assumptions which may turn out to be conservative. The assumptions that need to be made for assessing the exposure potential due to the ingestion of sediment would be expected to differ in many respects from those which were made for the assessment of the ingestion of soils.

It is obvious, that the geographical extent of sediments is much more restricted than the extent of soils. Thus, the river and creek beds have to be sought out, people have to enter the water or stop at the edge of the watercourse, get muddy and eat sediment. This may happen, but it stretches the imagination too far to postulate that this will happen every second day (actually 60% of all days) from the time that an infant learns how to crawl until that same person reaches the age of 70. There is even an internal contradiction in the exposure scenario, in that children are expected to wade 10 times per year, and adults are expected to wade 5 times per year, however, the ingestion of sediment is assumed to take place with a much greater frequency than the frequency of wading.

The subsequent exposure assessment will focus on Sample area 22 in the Unnamed Tributary as a specific example. In this location a single surficial sediment sample was found to contain 102 ug As/g sediment. If one applies the exposure assumptions made by CH_2M-Hill of a life time average sediment consumption of 0.017 g/day to this, then the average daily intake of As from this source alone would be hypothesized to be:

102 ug As/g x 0.017 g/day = 1.73 ug As/day.

This level of arsenic intake should be compared to the intake of

arsenic from other sources.

The drinking water standard for As is 50 ug/l. While most drinking water supplies contain less As than this, about 3 % of groundwater supplies exceed this level. Assuming a daily intake of 2 liters of drinking water at 50 ppb, would result in a daily intake of 100 ug As/day from such a source alone.

An institutional diet for one day reported by H.A. Schroeder and J.J. Balassa (1966) [Abnormal trace elements in man: Arsenic. J. Chronic Dis. 19:85-106] contained 411 ug As. If the diet contains significant amounts of seafood, the arsenic intake may be even higher, since many marine organisms contain more than 10 ug As/g.

In both of these examples the exposure from As in sediments, even under CH_2M-Hill's exaggerated sediment ingestion scenario, assume a trivial proportion of the total exposure. If the total normal exposure to As is taken as an input to the risk assessment model used by CH_2M-Hill, then the expected cancer incidence due to As ingestion alone would be predicted to be close to certainty. This does not appear to be the case. Therefore the risk assessment model for arsenic contains a major flaw, which makes it unsuitable for use.

CH_2M-Hill has failed to demonstrate that the daily ingestion of even 2 ug of As poses an undue risk, and has failed specifically to demonstrate that the As content in the sediments of Fields Brook or its tributaries constitutes an undue risk.

BIOGRAPHICAL SKETCH

ROLF HARTUNG

NON-RESPONSIVE

Education

University of Michigan, Ann Arbor (Wildl. Mgmt.)	B.S.	1960
University of Michigan, Ann Arbor (Wildl. Mgmt.)	M.W.M.	1962
University of Michigan, Ann Arbor (Wildl. Mgmt.)	Ph.D.	1964

Honors

Sigma Xi; Phi Sigma; Phi Kappa Phi; H.M. Wight Award, School of Natural Resources, University of Michigan, 1963.

Professional Experience

Chairman, Toxicology Program, University of Michigan, 1974 to present.

Professor of Environmental Toxicology, University of Michigan, Dept. Environmental & Industrial Health, 1973 to present.

Associate Professor, University of Michigan, Dept. Environmental & Industrial Health, 1969-1973.

Assistant Professor, University of Michigan, Dept. Industrial Health, 1965-1969.

Lecturer, University of Michigan, Dept. Industrial Health, 1964.

Instructor, University of Michigan, Dept. Wildlife Mgmt., 1963.

Courses Taught

Essentials of Toxicology
Toxicology of Foods and Food Additives
Ecological Toxicology
Industrial Toxicology
Methods in Toxicology
Life Histories of Game Animals
Functional Anatomy of Mammals and Birds
Research in Toxicology
Research in Environmental and Industrial Health
Doctoral Thesis Research (Toxicology, Env. & Ind. Health)
Seminars in Toxicology

Research Experience (funded research projects)

Effects of Oils on Waterfowl - Ph.D. research: A study of physiological and toxicological effects of oils on ducks. 1960-64. Funding: NSF, University of Michigan, Wildlife Management Institute.

Occupational Hazards of 2-Aminoethanols: Effects of alkyl-substituted 2-aminoethanols at the biochemical and organismal levels. 1964-70. Funding: NIH.

Interactions of Pesticides & Sedimented Oils: Partitioning and subsequent availability of DDT and related pesticides into sedimented oils under natural and laboratory conditions. 1966-69. Funding: NIH.

Methoxychlor Study in Fish: Acute and chronic effects of methoxychlor on minnows and perch. Growth, reproduction, and metabolic studies in aquaria and in an artificial stream. 1971-72. Funding: EPA.

Seasonal Dynamics of Pesticides in Western Lake Erie: Sediment, water, biota interactions in pesticide transfer dynamics. 1969-70. Funding: Sea Grant.

Preferential Toxicity for Long Nerve Fibers: Genesis of demyelinating lesions by tri-o-tolylphosphate in sciatic nerves. 1968-69. Funding: NIH - GRS.

Ecology of Organo-Mercury Compounds in South-Eastern Michigan: Relative levels of methyl-mercury and total mercury at different ecological levels, including man. 1970-71. Funding: Mich. Dept. Public Hlth.

Dynamics of Heavy Metals in the Lower Mississippi: Distribution and dynamics of mercury, lead, manganese, chromium, cadmium, and arsenic in the lower Mississippi (water, sediment, biota). 1970-72. Funding: Kaiser Aluminum and Chemical Co.

Factors in the Synthesis of Organo-Mercury Compounds: Analysis of chemical and physical variables in monomethyl-mercury synthesis in natural sediments. 1971. Funding: University of Michigan.

Metabolism and Mechanism of Toxicity of N-Substituted Ethanolamines: The role of cyclic AMP in the production of toxic effects, with special reference to the microsomal enzyme system. 1972-73. Funding: NIH - GRS.

Acute Toxicity of Specified Industrial Compounds: 1973-74 Funding: Olin Corporation.

Analysis and Toxicity of the Thermal Decomposition Products of Certain Olin Urethane Foams and Related Materials: 1974-77. Funding: Olin Corporation.

Analysis and Toxicity of the Combustion Products of Natural and Synthetic Materials: 1974-78. Funding: Society of Plastics Industry and Manufacturing Chemists Association.

Toxic Substances in the Great Lakes System: 1976-77. Funding: Sea Grant - NOAA.

Toxicity of Combustion Products of Plastics: 1978 to present. Funding: Society of Plastics Industry.

Early Assessment of Potential for Environmental Toxicity of Pollutants in the Great Lakes: 1978 to present. Funding: Sea Grant - NOAA.

Professional Societies

American Association for the Advancement of Science
American Institute of Biological Sciences
New York Academy of Science
Science Research Club, University of Michigan
Society of Toxicology
Wildlife Disease Association
Wildlife Society
American Industrial Hygiene Association
Michigan Industrial Hygiene Association

Other Professional Activities

Reviewer of Articles for:

Science
Canadian Journal of Zoology
Journal of Wildlife Management
Journal of the American Fisheries Society
Toxicology and Applied Pharmacology
Ecology of Food and Nutrition

Review of Grant Applications for:

National Science Foundation
Environmental Protection Agency

Administrative and Related Activities

Univ. of Michigan Interdept. Program in Toxicology, (member 1969-present) Chairman, 1974-present.

Univ. of Michigan Water Resources Sciences Committee, Chairman (1971-1974).

Univ. of Michigan School of Public Health, Human Studies Review Committee (1973-1975).

Univ. of Michigan School of Public Health Review Committee member (1972-1973).

Univ. of Michigan Department of Environmental & Industrial Health, Executive Advisory Committee, member (1971-1976).

Univ. of Michigan Water Resources Review Committee, member (1972-1974).

Univ. of Michigan School of Public Health, Data Processing Committee, member (1967-1972).

Univ. of Michigan School of Public Health, Committee on Instruction, member (1967-1968).

Univ. of Michigan Water Resources Sciences Review Committee, Chairman (1972).

Univ. of Michigan School of Public Health, Executive Committee, member (1976-1978).

Univ. of Michigan School of Public Health, Review Committee for Health Planning and Administration, Chairman (1978-present).

Univ. of Michigan Department of Environmental & Industrial Health, Executive Committee, member (1978-present).

Present Service Activities

International Joint Commission: Member, Committee on the Assessment of Human Health Effects of Great Lakes Water Quality.

National Academy of Sciences - National Research Council: Member, Subcommittee on the Geochemical Environment in Relation to Health and Disease.

Michigan Department of Natural Resources: Member, Critical Materials Advisory Committee.

Institute of Electrical and Electronic Engineers: Member, Liquid Dielectric Committee on Toxicity and Environmental Safety.

Consultant to (past and present):

Alcoa
Aluminum Corporation of Canada
American Oil Corporation
Dow Chemical Co.
Ecology Center, Ann Arbor
Electrical Power Research Institute
Environmental Research Group, Inc.
Ethyl Corporation
General Electric
Hooker Chemicals & Plastics Co.
International Joint Commission
International Primary Aluminum Institute
Kaiser Aluminum and Chemical Corp.
Manufacturing Chemists Association
Michigan Department of Natural Resources
Monsanto
National Academy of Sciences - NRC
National Sanitation Foundation
Olin Corporation
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Food and Drug Administration
Wisconsin Department of Justice

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Hartung, R., and Hunt, G.S.: Some Toxic Effects of Ingested Polluting Oils on Waterfowl. Toxicology and Applied Pharmacology, 7:3:484-488 (May) 1965. ABSTRACT

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Hartung, R., and Cornish, H.H.: Acute Toxicity of Alkyl-Substituted 2-Aminoethanols. Toxicology and Applied Pharmacology, 8:2:344 (March) 1966. ABSTRACT

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Hartung, R., and Klingler, G.W.: Sedimentation of Floating Oils. Papers of the Michigan Academy of Science, Arts, and Letters, 53:23-27 (1968).

Hartung, R., and Cornish, H.H.: Cholinesterase Inhibition in the Acute Toxicity of Alkyl-Substituted 2-Aminoethanols. Toxicology & Applied Pharmacology, 12:3:486-494 (May) 1968.

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Hartung, R., and Cornish, H.H.: Acute and Short-term Oral Toxicity of 2-N-Ethylaminoethanol in Rats. Food & Cosmet. Toxicology, 7:595-602 (May) 1969.

Cornish, H.H., and Hartung, R.: The Subacute Toxicity of 1, 1-Dimethyl-hydrazine. Toxicology & Applied Pharmacology, 15:1:62-68 (July) 1969.

Hartung, R., Pittle, L.B., and Cornish, H.H.: Convulsions Induced by 2-Di-n-butylaminoethanol. Toxicology & Applied Pharmacology, 14:3:660 (1969). ABSTRACT

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